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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/576,070

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Friedrich Boecking

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ALEXANDRIA, VA 22314

EXAMINER

COLEMAN, KEITH A

ART UNIT

PAPER NUMBER

4175

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/576,070	<b>Applicant(s)</b> BOECKING, FRIEDRICH	
	<b>Examiner</b> Keith A. Coleman	<b>Art Unit</b> 4175	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 11-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/14/2006</u> .   | 6) <input type="checkbox"/> Other: ____.                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claims 11-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claims 11 and 13 recite the limitation "the needle parts" in claim 11. In addition, Claims 12, 14, 15, 16, 17, 18, and 20 recite the limitation of outer and inner needle parts in claim 12. There is insufficient antecedent basis for these limitations in the claims. As to claim 19, since claim 19 depends on claim 11 and claim 19 does not further make clear what applicant is claiming, claim 19 is also rejected. To further prosecution, the needle parts are interpreted as having inner and outer parts.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsumura et al. (US Patent No. 4,381,077) in view of Schechter et al. (US Patent No. 4,381,077).

With regards to claim 11, Tsumura et al. discloses a hydraulic booster assembly (See Figures 1 and 2) connected downstream of the actuator (38, via

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14, Col. 3, Line 8), and control chambers (not shown, air intake via conduit 28, and fuel tank via conduit 26, Col. 2, Lines 60-65) associated with the multi-part injection valve member for actuating the valve member (60, 22), the improvement wherein the hydraulic booster assembly actuated by the actuator (38) comprises first (68, Col. 3, Lines 35-36, See Figure 1) and second booster chambers (upper chamber of 62 separated by ledge 72, See Figure 1) which are each directly connected hydraulically with separate control chambers (not shown, air intake via 26, and fuel tank via 28) that actuate the needle parts of the injection valve member (60,22), a nozzle body (18, Col. 3, Line 50), an injection valve (60,22) member embodied in multiple parts (i.e. inner and outer needle parts) is received in the nozzle body (18, Col. 3, Line 50), and an actuator (38, via 14, Col. 3, Line 8), and the injector (10, Col. 2, Line 48, See Figure 1) having an injector body (16, Col. 2, Line 48, See Figure 1). Tsumura et al. does not positively disclose a fuel injector for a common rail injection system for injecting fuel into a combustion chamber of an internal combustion engine. Schechter et al. discloses a fuel injector (10, Col. 2, Lines 60-62, 50, Col. 4, Line 1) for a common rail injection system (58, Col. 3, Line 68) for injecting fuel into a combustion chamber of an internal combustion engine (Col. 1, Lines 8-10). As to a piezoelectric actuator, since Schechter et al. explicitly states that the solenoids can be replaced by piezoelectric actuators (Col. 2, Line 40) or other actuating devices and also discloses an injector (10) having an injector body (12, Col. 2, Lines 60-61), a nozzle body (22, Col. 2, Line 67), an injection valve member (18, Col. 2, Line 65) embodied in multiple parts in the nozzle body (22, See Figure 1) with an actuator

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(near 42, See Figure 3, Col. 3, Lines 23-29), it would have been obvious to a person of ordinary skill in the art at the time the invention was made to substitute the mechanical actuator of Tsumura et al. with a piezoelectric actuator in view of the teaching to Schechter et al., in order to control the fuel and air entering the injector (Col. 2, Lines 38-42 from Schechter et al.).

With regards to claim 19, Tsumura et al. discloses wherein the actuator (38, via 14, Col. 3, Line 8) is integrated with the fuel inlet (See Figure 1). Using broadest reasonable interpretation, "integrate" is defined as to bring together or incorporate (parts) into a whole, and the actuator (38) is united with the fuel passage (i.e. fuel passage 30 is to the right of actuator 38, Col. 2, Line 59, See Figure 1) into a whole apparatus (16, See Figures 1 and 2).

With regards to claim 12, Tsumura et al. discloses wherein the first booster chamber (68, Col. 3, Lines 35-36) communicates with a second control chamber (i.e. air intake, not shown, via air inlet 28 and conduit 34, Col. 2, Lines 60-65) for the outer needle part (22, Col. 2, Line 52) via a conduit (34, See Figures 1 and 2), and the second booster chamber (upper chamber of 62, Col. 3, Line 31, See Figure 1) communicates with a first control chamber (i.e. fuel tank, via fuel inlet 26 and passage 64 and 66, Col. 3, Lines 30-35) for the inner needle part (60, Col. 3, Line 26, See Figure 1).

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With regards to claim 13, Tsumura et al. discloses a pressure chamber (lower part of chamber 62 separated by ledge 72, Col. 3, Line 43) embodied between the needle parts (60,22) guided one inside the other (60, 22, See Figures 1 and 2), of the multi-part injection valve member, which pressure chamber (lower part of 62) can be filled from a nozzle chamber (68) surrounding the multi-part injection valve member (via 68 and passage 64 and 66, Col. 3, Lines 30-35).

With regards to claim 14, Tsumura et al. discloses a first (top part of 22, See Figure 2) and a second pressure step (bottom of ledge 72, See Figure 2) on the outer needle part (22, ledge 72 is integrated into outer needle part 22) and acting in the opening direction (See Figures 1 and 2).

With regards to claim 15, Tsumura et al. discloses a first (top part of 22, See Figure 2) and a second pressure step (bottom of ledge 72, See Figure 2) on the outer needle part (22, ledge 72 is integrated into outer needle part 22) and acting in the opening direction, the second pressure step (22, ledge 72 is integrated into outer needle part 22) being embodied in said pressure chamber (lower section of 62 separated by ledge 72, See Figure 1).

With regards to claim 16, Tsumura et al. discloses all the limitations of the claimed subject matter, including a pressure step (bottom area of top 74, Col. 3, Line 43, See Figure 1) embodied on the inner needle part (60), on the end

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thereof toward the combustion chamber (88, Col. 3, Lines 66-67), except the hydraulic area of said pressure step on the inner needle part being operative in the opening direction of the inner needle part being less than the hydraulically operative areas of the first and second pressure steps of the outer needle part. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the hydraulic areas of Tsumura et al. with the hydraulic area of said pressure step on the inner needle part being operative in the opening direction of the inner needle part being less than the hydraulically operative areas of the first and second pressure steps of the outer needle part because the modification is invariably a change in size. See MPEP 2144.04. In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. CIR. 1984), cert. Denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

With regards to claim 17, Tsumura et al. discloses all the limitations of the claimed subject matter except wherein the hydraulically operative areas, in the opening direction, of the pressure steps of the outer needle part exceed the hydraulically operative area on the end toward the combustion chamber of the inner needle part. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the hydraulic areas of Tsumura

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et al. with wherein the hydraulically operative areas, in the opening direction, of the pressure steps of the outer needle part exceed the hydraulically operative area on the end toward the combustion chamber of the inner needle part because the modification is invariably a change in size. See MPEP 2144.04. In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. CIR. 1984), cert. Denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

With regards to claim 18, Tsumura et al. discloses a first seat formed on the outer needle part (the bottom portion of 22) and a second seat formed on the inner needle part (84, the bottom portion of 60, Col. 3, Line 59, See Figure 1), which seats cooperate with a wall of the nozzle body (18, See Figures 1 and 2).

With regards to claim 20, Tsumura et al. discloses a first injection openings (80, Col. 3, Line 51, See Figure 1, from Figure 1 there are two openings, Left opening being the first opening) that can be opened or closed by the first seat (when 60 and/or 22 is opened or closed position, See Figures 1 and 2) and second injection openings (80, Col. 3, Line 51, See Figure 1, from Figure 1 there are two openings, Right opening being the second opening) that can be opened or closed by the second seat (when 60 and/or 22 is opened or closed,

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See Figures 1 and 2), said first and second injection openings (80) being embodied on the nozzle body (18) and opening in the direction of the combustion chamber (88, See Figures 1 and 2).

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cho (US Patent No. 7,252,076) shows the current state of the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith A. Coleman whose telephone number is 571-270-3516. The examiner can normally be reached on Monday through Friday between 5:30-3 Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrence Till can be reached on (571) 272-1280. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Terrence R Till/  
Supervisory Patent Examiner, Art Unit 4175

KAC  
/K. A. C./